

REMARKS

Claims 1-48, all the claims pending in the application, stand rejected on prior art grounds. Claims 1-7 stand rejected upon informalities. Claims 1, 8, 18, 27, and 43 are amended herein. Applicants respectfully traverse these rejections based on the following discussion.

I. The 35 U.S.C. §112, Second Paragraph, Rejection

Claims 1-7 stand rejected under 35 U.S.C. §112, second paragraph. These rejections are traversed as explained below. Independent claim 1 is amended to define "...an extreme ultraviolet reflective region; and an extreme ultraviolet scattering region..." Accordingly, extreme ultraviolet reflective and scattering regions are used to make the extreme ultraviolet lithography (EUVL) mask. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. The Prior Art Rejections

Claims 1, 4-7 stand rejected under 35 U.S.C. §102(b) as being anticipated by Stivers et al. (U.S. Patent No. 6,410,193), hereinafter referred to as "Stivers". Claims 1, 4-7 stand rejected under 35 U.S.C. §102(e) as being anticipated by Eurlings et al. (U.S. Patent No. 6,927,004), hereinafter referred to as "Eurlings". Claims 1-48 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Stivers or Eurlings, in view of Cardinale (U.S. Patent No. 6,368,942) and Kirchauer et al. (U.S. Patent No. 6,479,195), hereinafter referred to as "Kirchauer". Applicants respectfully traverse these rejections based on the following discussion.

Stivers teaches a reflective mask having non-reflective and reflective regions, where the

reflective regions are reflective of a first light that has an inspection wavelength and are reflective of a second light that has a semiconductor processing exposure wavelength. The non-reflective regions are less reflective of the first light and the second light than the reflective regions in order to create: 1) a first image with a contrast greater than 0.210 and that is formed by reflecting the first light off of the reflective mask; and 2) a second image with a contrast greater than 0.750 and that is formed by reflecting the second light off of the reflective mask.

Eurlings teaches a reflective mask having a sub-resolution texture applied to absorbing areas to reduce the amount of power in the specular reflection. The texture may form a phase contrast grating or may be a diffuser. The same technique may be applied to the other absorbers in a lithographic apparatus.

Cardinale teaches a method for fabricating masks for extreme ultraviolet lithography (EUVL) using Ultra-Low Expansion (ULE) substrates and crystalline silicon. ULE substrates are required for the necessary thermal management in EUVL mask blanks, and defect detection and classification have been obtained using crystalline silicon substrate materials. Thus, this method provides the advantages for both the ULE substrate and the crystalline silicon in an Extreme Ultra-Violet (EUV) mask blank. The method is carried out by bonding a crystalline silicon wafer or member to a ULE wafer or substrate and thinning the silicon to produce a 5-10 μm thick crystalline silicon layer on the surface of the ULE substrate. The thinning of the crystalline silicon may be carried out, for example, by chemical mechanical polishing and if necessary or desired, oxidizing the silicon followed by etching to the desired thickness of the silicon.

Kirchauer discloses a reflective mask for EUVL to produce tight CD control on a wafer

and a process for fabricating such a mask. In one embodiment, the upper corners of the edges of the absorber layer are rounded or smooth. In another embodiment, the upper surface of the absorber layer is rough. In a further embodiment, an antireflective coating is disposed on the absorber layer.

However, the claimed invention, as provided in amended independent claims 1, 8, 18, 27, and 43 contain features, which are patentably distinguishable from the prior art references of record. Specifically, claims 1, 27, and 43 recite, in part, “[a]n (EUVL) mask comprising only a reflective upper surface,” claim 8 recites, in part, “[a] radiation scattering reflective mask comprising only a reflective upper surface, said radiation scattering reflective mask,” and claim 18 recites, in part, “wherein said multilayer comprises only a reflective upper surface.” Stivers teaches reflective and non-reflective upper regions (see FIG. 1B). Likewise, Eurlings teaches an upper surface comprising an absorbing area (22) (see FIGS. 10-13). Moreover, the high reflectance and low reflectance areas do not comprise the same material in Eurlings. Accordingly, the prior art of record does not teach the limitation of having only a reflective upper surface, which the Applicants’ claimed invention provides. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

III. Formal Matters and Conclusion

With respect to the objections/rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully


requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-48, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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